CSCI 361: Reading Assignment # 14

Your Name: Kunal Pal

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

The variable gadget is diamond-shaped. Depending on whether or not we select a variable x_i or $\overline{x_i}$ in clause c_j, we can detour at a pair to get even - True or False.

2. What is the clause gadget? How is it connected to the variable gadgets?

The clause gadget is a node. Ultimately, each diamond structure contains a horizontal row of nodes connected by edges in both directions. If a variable x_i appears in clause c_j, we add two edges from the j^{th} pair in the i^{th} diamond to the j^{th} clause node.

CSCI 361: Reading Assignment # 14

Your Name: Noah Capt

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

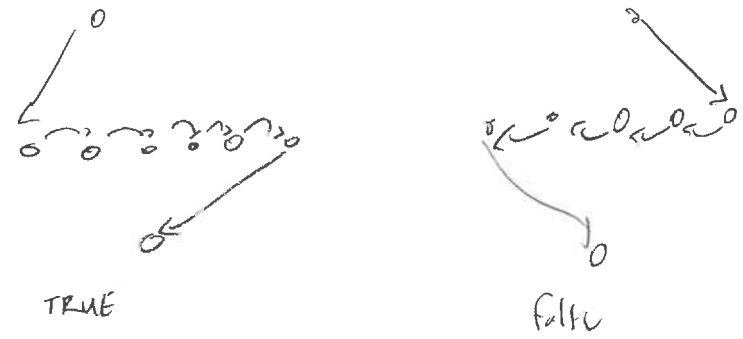
- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

Diamond shape w/ path of nodes in middle.



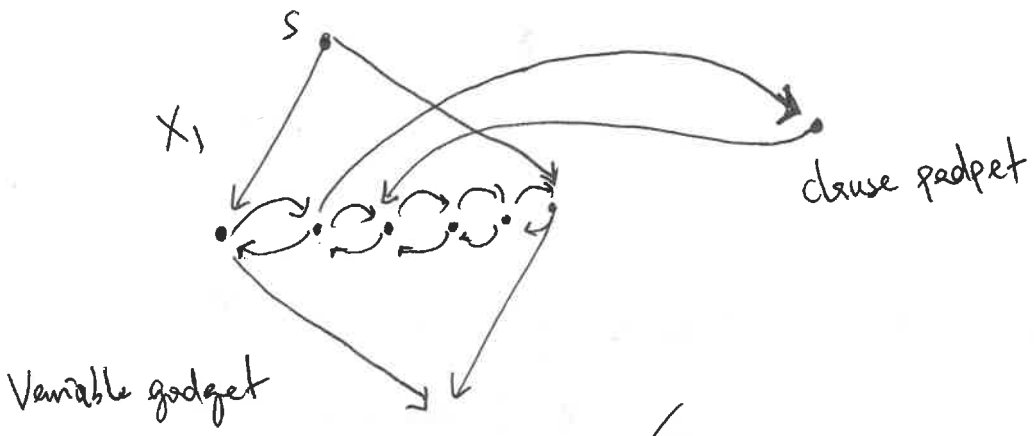
2. What is the clause gadget? How is it connected to the variable gadgets?

For each variable in the path of the diamond there is a clause node that connects in/out to the node in the path it is in that clause.

Reading Assignment #14

1) What shape is the variable gadget? How does the order in w/c this shape is traversed correspond to the truth value of the corresponding variable?

⇒) Diamond shape



⊛ If we traverse the graph ↙↗ in this way, we can hit the (zig zag) clause gadget so making the corresponding variable true.

2) What is the clause gadget? How is it connected to variable gadgets?

⇒) Clause gadget is just one of the nodes which forces the graph to make a detour by setting x_i to be <u>true</u>

CSCI 361: Reading Assignment # 14

Your Name: Ahmed Hussain.

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

The variable gadget is a diamond structure ~~corresponding to the two truth values~~. The clause gadget is which can be traversed in either of two ways, corresponding to the two truth values

2. What is the clause gadget? How is it connected to the variable gadgets?

The clause gadget is a node. If variable x_i appears in clause c_j, we add the two edges from the jth pair in the ith diamond to the jth clause.

CSCI 361: Reading Assignment # 14

Your Name: Ben Lin

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

Diamond shaped

if true, zig-zag left to right

if false, zag-zig

2. What is the clause gadget? How is it connected to the variable gadgets?

node for each clause connected to the node pair in ~~the~~ a horizontal row in the variable gadgets

CSCI 361: Reading Assignment # 14

Your Name: Lola Kowalski

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

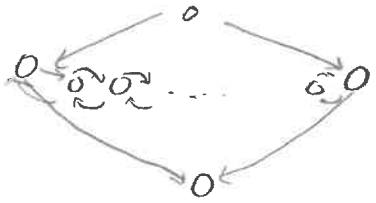
- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

Variable gadget → diamond structure



if variable is true it goes like

" " " false it goes like

2. What is the clause gadget? How is it connected to the variable gadgets?

Clause gadget is a single node

If x_i appears in clause then you make edges from the pair in the diamond to the clause node like

if $\overline{x_i}$ order is reversed

CSCI 361: Reading Assignment # 14 **Your Name:** Juan Mendez

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

The variable gadget has a diamond structure w/ a horizontal line of nodes. If X_i is True, the diamond is traversed in a zig-zag: ↳. If X_i is False, the diamond is traversed in a "zag-zig": ↲

2. What is the clause gadget? How is it connected to the variable gadgets?

The clause gadget is just a singular node. Each clause in the Boolean statement has a corresponding node. The clause nodes are connected to the variable gadgets via edges to pairs of nodes in the diamonds.

CSCI 361: Reading Assignment # 14

Your Name: Prairie

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

- Sipser Third Edition 7.5 **(Additional NP Complete Problems)**

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

Diamond — if the gadget is assigned TRUE, the gadget is traversed left-to-right, right-to-left if FALSE

2. What is the clause gadget? How is it connected to the variable gadgets?

The clause gadget is a single node connected to the variable gadget if $x_i \in$ clause c_j, or connected reversely if $\overline{x_i} \in c_j$.

CSCI 361: Reading Assignment # 14 **Your Name:** Jarin Sutton

Due: Tuesday, Nov 19, in class

Assigned reading for this lecture:

- Sipser Third Edition 7.5 (**Additional NP Complete Problems**)

Read the Reduction from **3SAT** to **HAMPATH** (Theorem 7.46).

Questions:

1. What shape is the variable gadget? How does the order in which this shape is traversed correspond to the truth value of the corresponding variable?

   The shape of the variable gadget is a diamond.
   One direction corresponds to a truth value of true.
   The other direction corresponds to a truth value of false.

2. What is the clause gadget? How is it connected to the variable gadgets?

   The clause gadget is a node.
   If a clause is satisfied, then a path runs through.